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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/621,595 | 07/17/2003 | George M. Murray | 1853-SPL | 2591 |

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| EXAMINER |
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SUNG, CHRISTINE

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| ART UNIT | PAPER NUMBER |
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2884

DATE MAILED: 12/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 10/621,595 | Applicant(s) MURRAY ET AL. | |
| | Examiner Christine Sung | Art Unit 2884 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

1. The amendment filed on September 12, 2005 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 11-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Tarkkanen (US Patent 3,999,070 A).

Regarding claim 11, Tarkkanen discloses a liquid cocktail mixture for detecting the presence of neutrons comprising:

a neutron absorber component (column 4, lines 23-25) dissolved in water (column 2, line64- column 3, line 19);

and a liquid scintillator component (column 2, lines 63-66).

Regarding claim 12, Tarkkanen discloses that the liquid cocktail mixture further comprises a wavelength shifter for converting light produced by the scintillator component to another wavelength (column 4, lines 20-23).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langenbruner (US Patent 5,514,870 A) in view of Tarkkanen (US Patent 3,999,070 A).

Regarding claim 1, Langenbruner discloses a system for detecting neutron radiation (column 9, lines 19-30) comprising:

A scintillator (Figure 1B, element 10) in a tube having a mirror (element 16) at one end of the tube and a windowed portal or optical coupler (element 20) at the other end of the tube such that neutrons that penetrate the tube react with the neutron absorber producing ionization that excites the scintillator and produces photons (element 14);

a photo-multiplier tube (element 22) coupled with the windowed portal or optical couple (element 20) for receiving the photons and converting the photons to electrical signal;

and a processing device for receiving and analyzing the electrical signals so as to provide a measurement pertaining to the presence and relative strength of neutron radiation (column 5, line 56-column 6, line 67). Langenbruner does not specify that the liquid cocktail mixture comprises a neutron absorber and a scintillator. However, Tarkkanen discloses a liquid cocktail mixture for detecting the presence of neutrons comprising: a neutron absorber component

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(column 4, lines 23-25) dissolved in water (column 2, line 64- column 3, line 19); and a liquid scintillator component (column 2, lines 63-66). One of ordinary skill in the art would be motivated to switch the crystal scintillator as disclosed by Langenbruner with the liquid cocktail scintillator as disclosed by Tarkkanen as liquid scintillators provide a means for filling an entire detector housing in a homogeneous fashion, thus increasing spectral linearity (see both of the Cusano references in the cited pertinent art

Regarding claim 2, Tarkkanen discloses that the liquid cocktail mixture further comprises a wavelength shifter for converting light produced by the scintillator component to another wavelength (column 4, lines 20-23).

Regarding claim 3, Langenbruner discloses that the tube is coated with Teflon® acting as a liquid light guide (element 18), the liquid light guide capable of monitoring large apertured areas.

Regarding claim 4, Langenbruner discloses that the system tube is a portable survey instrument (column 1, lines 20-26).

7. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langenbruner (US Patent 5,514,870 A) in view of Tarkkanen (US Patent 3,999,070 A) further in view of Yoshino et al. (US Patent 4,975,222 A)

Regarding claims 5 and 7, Langenbruner in view of Tarkkanen discloses the limitations set forth in claim 1, but does not disclose that the radiation absorber is made of lithium tetrafluoroborate. However, such a material is known in the art, as demonstrated by Yoshino, for the detection of neutrons (see column 7, lines 1-14). One of ordinary skill in the art would be motivated to use the material as disclosed by Yoshino with the invention as disclosed by

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Langenbruner in view of Tarkkanen, as such material is readily available and is manufactured easily, thus reducing the complexity of manufacturing the product.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Langenbruner (US Patent 5,514,870 A) in view of Tarkkanen (US Patent 3,999,070 A) further in view of Maeda (US Patent 4,620,939 A).

9. Regarding claim 6, Langenbruner in view of Tarkkanen discloses the limitations set forth in claims 1, but does not disclose that the radiation absorber is made of lithium chloride.

However, such a material is known in the art, as demonstrated by Maeda, for the detection of neutrons (see column 3, lines 39-46). One of ordinary skill in the art would be motivated to use the material as disclosed by Maeda with the invention as disclosed by Langenbruner in view of Tarkkanen, as such material is readily available and is manufactured easily, thus reducing the complexity of manufacturing the product.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Langenbruner (US Patent 5,514,870 A) in view of Tarkkanen (US Patent 3,999,070 A) further in view of Zarling (US Patent 5,698,397 A).

Regarding claim 8, Langenbruner in view of Tarkkanen disclose the system of claim 1, but do not specify that the scintillator component of the cocktail mixture is comprised of a tris complex of 2,6-pyridine dicarboxylic acid (dipicolinic acid) $\text{Li}_3 [\text{Eu}(\text{DPA})_3]$. However, Zarling discloses that phosphors or scintillators are conventionally made composed of a rare earth dipicolinic acid compound (column 54, lines 59-62).

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11. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langenbruner (US Patent 5,514,870 A) in view of Tarkkanen (US Patent 3,999,070 A) further in view of Parkinson (US Patent 5,095,099 A).

Regarding claim 9, Langenbruner in view of Tarkkanen discloses the system of claim 2 in the above paragraphs but does not specify that the wavelength shifter component of the cocktail mixture is comprised of a rare earth chelate. However, rare earth chelates are known and commonly used wavelength shifting materials, as disclosed by Parkinson (see abstract). One of ordinary skill in the art would be motivated to use the conventional wavelength shifter as disclosed by Parkinson with the invention as disclosed by Langenbruner in view of Tarkkanen, as such material is readily available and is manufactured easily, thus reducing the complexity of manufacturing the entire system.

Regarding claim 10, Parkinson discloses that any rare earth element with an oxidation state of +3 may be used, and Europium, by definition is a group three element with an oxidation state of +3 (column 1, lines 49-61).

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable Tarkkanen (US Patent 3,999,070 A) in view of Yoshino et al. (US Patent 4,975,222 A)

Regarding claims 13, Tarkkanen discloses the limitations set forth in claims 11, but does not disclose that the radiation absorber is made of lithium tetrafluoroborate. However, such a material is known in the art, as demonstrated by Yoshino, for the detection of neutrons (see column 7, lines 1-14). One of ordinary skill in the art would be motivated to use the material as disclosed by Yoshino with the invention as disclosed by Tarkkanen, as such material is readily available and is manufactured easily, thus reducing the complexity of manufacturing the product.

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13. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tarkkanen (US Patent 3,999,070 A) in view of Maeda (US Patent 4,620,939 A).

Regarding claims 14-15, Tarkkanen discloses the limitations set forth in claims 1, but does not disclose that the radiation absorber is made of lithium chloride. However, such a material is known in the art, as demonstrated by Maeda, for the detection of neutrons (see column 3, lines 39-46). One of ordinary skill in the art would be motivated to use the material as disclosed by Maeda with the invention as disclosed by Tarkkanen, as such material is readily available and is manufactured easily, thus reducing the complexity of manufacturing the product.

14. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tarkkanen (US Patent 3,999,070 A) in view of Zarling (US Patent 5,698,397 A).

Regarding claim 16, Tarkkanen discloses the limitations of claim 11, but does not specify that the scintillator component of the cocktail mixture is comprised of a tris complex of 2,6-pyridine dicarboxylic acid (dipicolinic acid) $\text{Li}_3 [\text{Eu}(\text{DPA})_3]$. However, Zarling discloses that phosphors or scintillators are conventionally made composed of a rare earth dipicolinic acid compound (column 54, lines 59-62).

15. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tarkkanen (US Patent 3,999,070 A) in view of Parkinson (US Patent 5,095,099 A).

Regarding claim 17, Tarkkanen discloses the system of claim 12 in the above paragraphs but does not specify that the wavelength shifter component of the cocktail mixture is comprised of a rare earth chelate. However, rare earth chelates are known and commonly used wavelength shifting materials, as disclosed by Parkinson (see abstract). One of ordinary skill in the art would be motivated to use the conventional wavelength shifter as disclosed by Parkinson with the

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invention as disclosed by Tarkkanen, as such material is readily available and is manufactured easily, thus reducing the complexity of manufacturing the entire system.

Regarding claim 18, Parkinson discloses that any rare earth element with an oxidation state of +3 may be used, and Europium, by definition is a group three element with an oxidation state of +3 (column 1, lines 49-61).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. (US Patent 4,262,202 A)- this reference discloses using both liquid and solid scintillators interchangeably.

b. (US Patent 4,415,808 A)- this reference discloses using both liquid and solid scintillators interchangeably.

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

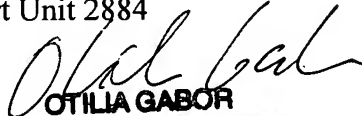
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Sung whose telephone number is 571-272-2448. The examiner can normally be reached on Monday- Friday 7-3 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CS

Christine Sung
Examiner
Art Unit 2884


OTILIA GABOR
PRIMARY EXAMINER